

Interview Summary	Application No.	Applicant(s)
	09/577,616	SENSEN ET AL.
	Examiner Joseph Leyson	Art Unit 1722

All participants (applicant, applicant's representative, PTO personnel):

(1) Joseph Leyson. (3) _____.

(2) Daniel Dorsey. (4) _____.

Date of Interview: 20 August 2002.

Type: a) Telephonic b) Video Conference
c) Personal [copy given to: 1) applicant 2) applicant's representative]

Exhibit shown or demonstration conducted: d) Yes e) No.
If Yes, brief description: _____.

Claim(s) discussed: all pending.

Identification of prior art discussed: Yamada et al.(-776).

Agreement with respect to the claims f) was reached. g) was not reached. h) N/A.

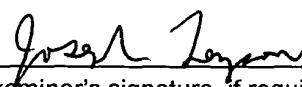
Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: Discussed proposed substitute specification which appears to have no new matter. Discussed proposed claim amendments and new claim 10. Proposed claim 5 overcomes the prior art above relative to a 102 rejection. However, the proposed claim amendments and new claim 10 are new issues.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

i) It is not necessary for applicant to provide a separate record of the substance of the interview(if box is checked).

Unless the paragraph above has been checked, THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN ONE MONTH FROM THIS INTERVIEW DATE TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.


Examiner's signature, if required

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case unless both applicant and examiner agree that the examiner will record same. Where the examiner agrees to record the substance of the interview, or when it is adequately recorded on the Form or in an attachment to the Form, the examiner should check the appropriate box at the bottom of the Form which informs the applicant that the submission of a separate record of the substance of the interview as a supplement to the Form is not required.

It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.



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IMPORTANT
FACSIMILE COVER LETTER

For Interview Only

From: Daniel K. Dorsey Date: August 19, 2002
 To: Examiner Joe Leyson Your Ref: USSN 09/577,616
Name
U.S. Patent Office Our Ref: p65350us0
Company

Facsimile No: 703-872-9616

TOTAL NUMBER OF PAGES, 12 INCLUDING COVER LETTER:

IF YOU DO NOT RECEIVE ALL OF THESE PAGES, PLEASE CALL.

Daniel K. Dorsey at 202-638-6666 ext 2274.

SPECIAL COMMENTS OR INSTRUCTIONS:

Attached is a Proposed Amended claims, Substitute Specification and Proposed Drawing Correction that we will discuss during the personal interview on August 20, 2002 at 10:00.

THIS COMMUNICATION IS INTENDED ONLY FOR THE USE OF THE ADDRESSEE AND MAY CONTAIN INFORMATION THAT IS PRIVILEGED AND CONFIDENTIAL. IF YOU ARE NOT THE INTENDED RECIPIENT, OR THE EMPLOYEE OR AGENT RESPONSIBLE FOR DELIVERING THIS COMMUNICATION TO THE INTENDED RECIPIENT, YOU ARE HEREBY NOTIFIED THAT ANY DISSEMINATION, DISTRIBUTION, COPYING, OR OTHER USE OF THIS COMMUNICATION IS STRICTLY PROHIBITED. IF YOU HAVE RECEIVED THIS COMMUNICATION IN ERROR, PLEASE NOTIFY US IMMEDIATELY BY TELEPHONE. THANK YOU.

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KLEMENS SENSEN et al

EXTRUDER DIE HEAD

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to an extruder die head, preferably a blown film head, comprising a central annular channel, which is provided with an annular outlet die and into whose outer limiting wall empty annular slits, which feed a polymer melt and which constitute the smaller diameter openings of truncated channels, formed between the internal and external shells of stacked, conical insert members.

Related Art

[The] EP 0 568 544 B1 discloses an extruder head for extruding multi-layered thermoplastic pipes of the kind described above, whose central annular channel is defined by a central mandrel, whose shell forms the inside wall of the channel, and by stacked conical insert members, which enclose [said] the channel and whose inside openings form the outer wall of the central annular channel. In this prior art extruder head, a truncated channel is formed between two bell shaped or conical insert members, which are provided with a radial feed borehole for the polymer melt. For each tubular layer of polymer melt to be extruded there are two conical insert members, which are stacked one over the other. The space between these insert members forms the annular slits. The insert members are held together by these clamping cover parts, which are connected together with tightening screws. The prior art extruder die head exhibits a significant

overall length, when multilayered pipes are to be produced. However, such long extruder die heads exhibit the drawback that the large height of the extruder die head results in long flow paths for the polymer melt. These paths in turn result in high rheological stress at the melt interfaces, a state that can lead to unstable flow behaviour. In particular, the long flow paths are a problem with polymer melts that cannot tolerate heating for a prolonged period of time. Such polymer melts decompose and become brittle when heated for long periods.

SUMMARY OF THE INVENTION

Therefore, the object of the invention is to provide an extruder die head of the class described in the introductory part. This extruder die head facilitates the extrusion of plastic tubes with arbitrary layers, but is characterized by a significantly shorter construction height.

The invention solves this problem in that the annular slits, feeding the polymer melts, also empty into the inside wall of the central annular channel. The annular slits are the smaller diameter openings of truncated channels, formed between the internal and external shells of stacked conical internal insert members.

It is also easy to build the extruder die head of the invention in modules. A number of conical insert members are stacked until the desired number of layers of the extruded tube is reached. While maintaining the same number of conical feed channels, thus the same number of extruded tubular layers, it is possible to make the extruder die head of the invention half the construction length of the prior art extruder die head, because,

based on the length of the conical insert members, two annular slits that feed the polymer melt can empty into the central annular channel. The significantly reduced axial length of the extruder die head of the invention results in an improved flow pattern of the melt that is fed in and less heat stress on the melt, because the melt spends correspondingly less time in the extruder die head.

The overall length of the extruder die head of the invention can be further reduced in that the internal and external shells of each insert member define the truncated channels for feeding the polymer melts into the central annular channel. In contrast to the prior art extruder die head, this design reduces the size of the conical insert members to half of their former size so that the overall length is correspondingly shortened.

The internal and external annular slits, which empty into the central annular channel, can lie in the same radial planes. Of course, it would also be possible to move the annular slits axially.

Preferably the internal and external shells of the conical insert members are two counter rotating spiral channels, whose depth tapers off in the direction of the opening. This design of the channels, wherein the melt overflows the channels in the axial direction, is well known.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout.

DESCRIPTION OF THE DRAWINGS

[One embodiment of the] The invention is explained in detail [below] with reference to the following drawings.

Figure 1 is a cross sectional view of a blown film die head with annular or conical channels, feeding five different melts.

Figure 2 is a sectional view of a blown film die head with annular or conical channels, feeding nine different melts.

DESCRIPTION OF THE INVENTION

Further scope of applicability of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

Figure 1 is a schematic drawing of a sectional view of a blown film die head, where five annular or conical channels, which feed different types of polymer melts, empty into a central annular channel 1.

The blown film die head comprises a bottom annular cover 2, which serves to hold conical insert members that are stacked on [said] the cover 2, and a top holding ring 17, 18. Each conical insert member includes an inside ring 4, 8, 9 and a corresponding outside ring 5, 10, 11. Bottom inside ring 4 has a cylindrical outer wall 44 and a conical inner wall 45. Both walls 44, 45 have a spiral groove 6, 66 whose depth tapers progressively toward the

top of the groove. Bottom outside ring 5 has a cylindrical inner wall 54 and a conical outer wall 55. Only conical outer wall 55 has a spiral groove 56. A first cylindrical feed channel 3 is formed between the rings 4 and 5, which exhibit a triangular cross section. The [ring's] ring base faces are screwed or clamped together with the bottom cover 2 in a manner that is not illustrated here. [The inside ring 4 exhibits a cylindrical outer wall and the outside ring 5 exhibits a cylindrical inside wall; both of these walls] The bottom cylindrical outer wall 44 and the cylindrical inner wall 54 define [an annular slit, which forms] the cylindrical feed channel 3[. The cylindrical shell of the inside ring 4 has a helical] and the spiral groove 6, whose depth tapers off toward the top[. These] becomes slotted helical passages which are indicated by the three grooves 6[, whose depth tapers off toward the top. The channels]. Channels 7, feeding a first polymer melt, empty into the bottom of helical passage 6.

Stacked on the bottom rings 4, 5, which lie in a common plane, are [other] inner middle conical [rings 8, 9 and 10, 11] ring 8 and outer middle conical ring 10. The middle conical rings 8, 10 define [with the] conical areas [of] with the bottom rings 4, 5 [the conical melt feed channels] and spiral passages 56. 67 connected to internal truncated conical annular channels 12, 13. The conical areas are formed by a conical middle inner wall 84 with the bottom conical inner wall 45, and a conical middle outer wall 105 with the bottom conical outer wall 55. These conical melt feed channels 12, 13 empty into a central annular channel 1, which is a continuation of the cylindrical [annular] feed channel 3 [and is] formed between the inside and outside cylindrical shell areas, generally indicated by 108, of the middle rings 8, 10. The

conical external shells of the rings 4, 5 have in turn spiral grooves 6, 66, whereby the melt feed channels (not illustrated here) empty into the bottom grooves having the greatest depth.

Mounted on the middle conical rings 8, 10 are [the] top conical [rings 9, 11] inner ring 9 and top conical outer ring 11, which define with the conical external shell areas [of the rings 8, 9 the conical]. The conical areas are formed by a conical middle inner wall 89 with a conical top inner wall 98, and a conical middle outer wall 111 with a top conical outer wall 110. Conical melt feed channels 130, 120 [which in turn] empty into the central annular channel 1. The external shell areas of the middle rings 8, [9 are] 10 have spiral grooves, whose height tapers off toward the top, on the inner middle conical wall 89 which mates with the outer middle conical wall 111.

The internal truncated conical annular channels 13, 130 and the external truncated conical annular channels 12, 120 slope in opposite directions at approximately the same angle to the central annular channel 1. Also, the internal and external truncated conical annular channels 12, 13, 120, 130 communicate with the central annular channel 1 in approximately the same radial plane, and the internal and external truncated conical channels 12, 120, 13, 130 are substantially concentrically spaced around the central annular channel 1. The bottom grooves with the greatest depth [empty into] are fed by the melt feeding channels 15, 16.

Mounted on the top conical [inserts] rings 9, 11 are top inside and outside holding rings 17, 18, between which the central annular channel 1 is defined with an annular outlet slit 19. An easy method for assembling the blown film die head together with

the bottom cover [12] 2 is to connect the top holding rings 17, 18 with tightening screws.

The inside rings 4, 8, 9 and the bottom cover 2 exhibit aligned axial passages, which form a passage channel 140 which houses the lines to feed in and exhaust the blowing air for the blown film die head.

The blown film die head, shown in Figure 2, exhibits in principle the same construction, as described with reference to Figure 1. The distinction between it and the blown film die head, depicted in Figure 1, lies only in the fact that between the inside and outside middle conical rings 8, 10 and the top inside and outside rings 9, 11 there are [other] additional inside conical rings 21, 22 and [other] additional outside conical rings 23, 24, which are designed analogously to the middle rings 8, 10. This arrangement of the additional conical rings makes it possible to feed, not five melts, but nine different melts with the blown film die head of Figure 2 for the purpose of producing a nine layered plastic tube.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and, accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

Version with markings to show changes made.In the Claims:

Please amend claims 1, 5 and 6, and add new claim 10, as follows:

1. (Twice Amended) An extruder die head, comprising a [central] central annular channel, which is provided with an annular outlet die slit and into whose outer limiting wall empty internal annular slits, which feed a polymer melt and which form smaller diameter openings of truncated channels, formed between internal and external shells of stacked, conical insert members, said annular slits[, feeding said polymer melts[, also empty] from said truncated channels into an inside wall of said central annular channel[, said annular slits being smaller diameter openings of truncated channels, formed between internal and external shells of stacked conical internal insert members], and said internal and external shells of said conical insert members are defined by two counter rotating spiral channels, whose depths taper off in a direction of each smaller diameter opening.

5. (Amended) A blown film head comprising a plurality of internal and external shells of stacked insert members which define a central annular channel having inner and outer walls [and], said shells having mating interior and exterior conical surfaces which define therebetween a plurality of [internal and external] spiral grooves which form truncated conical [annular]

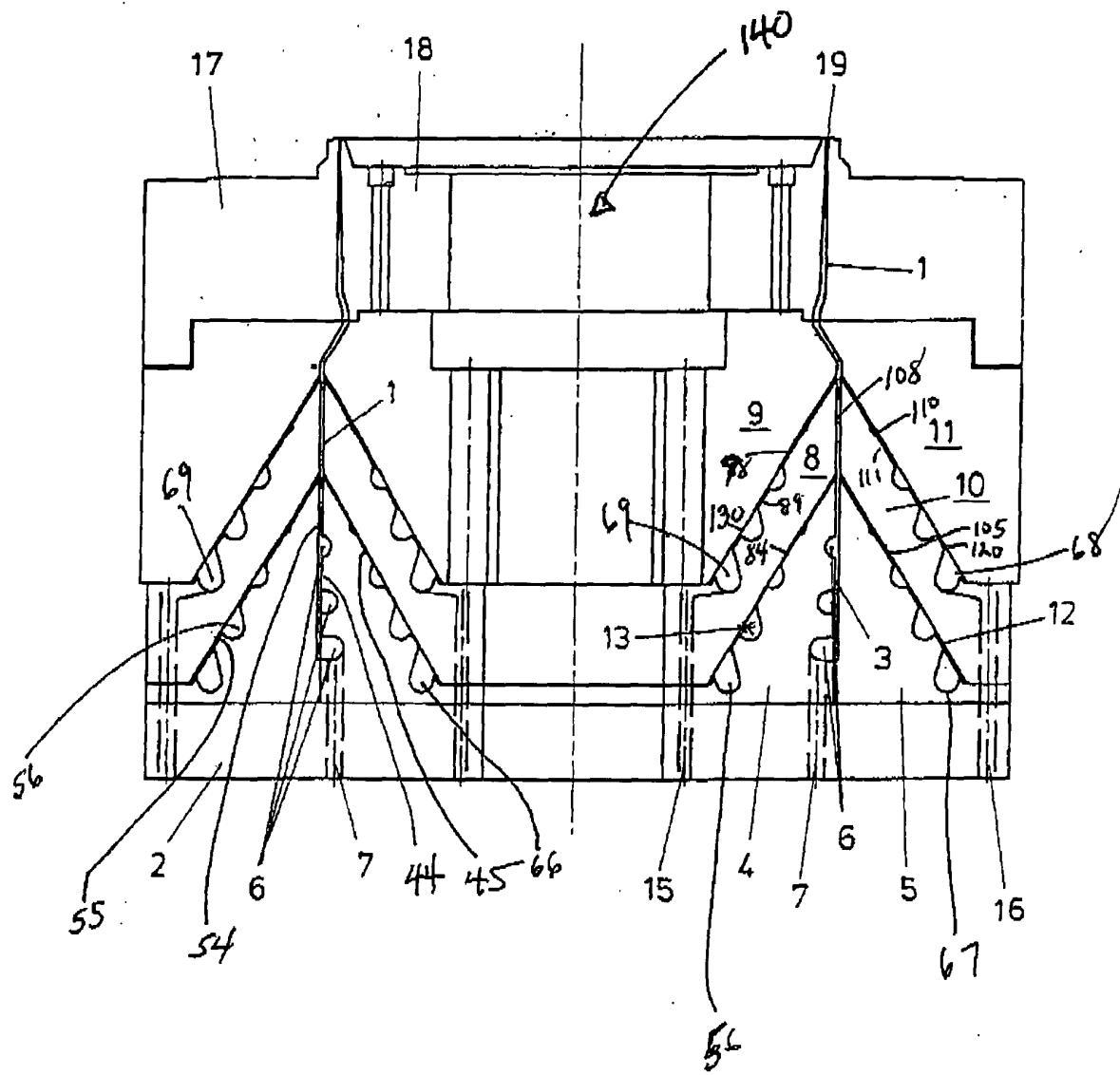
channels spaced around said central annular channel, said [internal and external] truncated conical [annular] channels communicating with said central annular channel to cause polymer melt in said truncated conical [annular] channels to empty [through said inside and outside walls of] into said central annular channel [onto polymer melt in said central annular channel to produce multilayered tubes of thermoplastic material.

6. (Amended) The blown film head as claimed in claim 5, wherein said internal truncated conical [annual] annular channels and said external truncated conical annular channels slope in opposite directions at approximately the same angle to said central annular channel.

10. (New) An extruder die head, comprising a central annular channel with an annular outlet die slit and an outer limiting wall empty internal annular slits, which feed a polymer melt and which form smaller diameter openings of truncated conical melt feed channels, formed between internal and external shells of stacked, conical insert members, said internal annular slits feeding said polymer melts from said conical melt feed channels into an inside channel, said inner annular slits and said shells having mating interior and exterior conical surfaces which define therebetween said conical melt feed channels.

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1/2

Figure 1

2/2

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Figure 2